Reproduction In Algae

- Vegetative → Fragmentation
- Asexual → Zoospores
- Sexual
  - Isogamous → Flagellated Gametes. Eg:- Chalamydomonas
  - Anisogamous. Eg:- Some Sps. Chalamydomonas
  - Oogamous. Eg:- Volvox Fucus → Non-Flagellated Gametes. Eg:- Spirogyra

Gymnosperm

- Root
  - Branched. Eg:- Pinus, Cedrus
  - Unbranched. Eg:- Cycas.
- Stem
- Leaf → Simple / Compound

Pinus (Root) (Mycorrhiza) → (Root + Fungi)

Cycas (Root) (Coralloid Root) → (Root + Cyano-Bacteria)

Level of Organisation

Cellular Level	Tissue Level	Tis. Sys or Organ Level	Organ Sys. Level
↓	↓	↓	↓
Porifera	Coelentrata, Ctenophora	Platyhel-	Aschelmintes. Annelida, Mollusca, Echinoder-, Hemichord-, Chordata

Digestion

Intra-Cellular	Both Intra & Extra Cel.	Extra-Cellular.
↓	↓	↓
Porifera	Coelentrata, Ctenophora	Platyhelminthe To Chordata

Chordate Charac:-

1. Notochord (Dorsal)
2. Ner. Cord (Dorsal)
3. Gill Slit (Paired)
4. Post Anal Tail

Polyp ⇄ (Asexually / Sexually) Medusa

- Polyp: Sessile, Cylindrical. Eg:- Hydra, Adamsia
- Medusa: Free-Swimming, Umbrella-Shaped. Eg:- Obelia.

Bryophytes

1. Main Plant Body (Haploid) Gametophyte
2. Gametophytic phase Longer
3. Sporophyte Dependent on Gametophyte.
4. True Stem, Leaves ↳ Root Not Found
5. Instead of Root Rhizoids Occur.
6. Non-Vascular Plant

Pteriodophytes.

2. Sporophyte (Diploid).
2. Sporophytic Phase Longer.
3. Both are Independent (G & S).
4. True Stem, Leaves Root Found.
5. True Roots (+).
6. Vascular Plant.

Pteridophyte Classify In 4 Classes.

1. Psilopsida (Psilophyta) Eg:- Psilotum ↳ Rhynia.
2. Lycopsida Eg:- Selaginella ↳ Lycopodium.
3. Sphenopsida Eg:- Equisetum (Horsetails).
4. Pteropsida (Filicophyta). Eg:- Pteris, Dryopteris, Adiantum Marsilea, Azolla, Salvinia

Classes	Major Pigment	Stored Food	Cell Wall	Flagellar Insertion	Habitat
Chlorophyceae Green Algae	Chlorophyll a, b	Starch	Cellulose	2-8 Equal Apical	Fresh Water, Salt Water, Brackish Water.
Phaeophyceae Brown Algae	Chlorophyll a, c Fucoxanthin	Mannitol Laminarin	Cellulose And Algin	2, Unequal Lateral	Fresh Water (Rare) Salt & Brackish Water
Rhodophyceae Red Algae	Chlorophyll a, d Phycoerythrin	Floridean Starch	Cellulose Pectin & Poly Sulphate Ester	Absent	Fresh Wa. (Some) Brackish Wat. Salt Water (Most).

Kingdom: Animalia (Multi-Cellular)

Level of Organisation	Symmetry	Coelom	Phylum
Cellular Level	Asymmerical		Porifera
	Radial		Cnidaria
			Ctenophora.
Tissue or Organ or Organ Syst.	Bilateral	Acoelomate	Platyhelminthes
		Pseudocoelma	Aschelminthes.
		Coelomates	Annelida
			Arthropoda
			Mollusca
			Echinodermata.
			Hemichordata
			Chordata.

NEET

Phylum	Segmentation	Dig. System	Circ. System	Resp. System
Porifera	Abent (A)	Absent (A)	Absent (A)	Absent (A)
Cnidaria	A	Incomplete (I)	A	A
Ctenophora	A	I	A	A
Platyhelminthes	A	I	A	A
Aschelminthes	A	Complete (C)	A	A
Annelida	Present (P)	C	P	A
Arthropoda	P	C	P	P
Mollusca	A	C	P	P
Echinodermata	A	C	P	P
Hemichordata	A	C	P	P
Chordata	P	C	P	P

* Marchantia

1. Marchantia is Dioecious (Sexes are Seprate.
2. Sex Organs Are borne On Umbrella-Shape Gametophores.
3. Male Thallus - Atheridiophore
   Female " - Archegonia.
4. Elater Mechanism Of Spore Dispersal Found In Marchatia/Liverworts.

Symmetry.

- Asymmetrical → Porifera (Sponges)
- Radial → Coelentrata, Ctenophora, Echinoder- (Adult Body)
- Bilateral → Platyhelmin-, Aschelminth-, Annelida, Arthropoda, Mollusca., Echinoder- (Larval St.), Hemichordata, Chordata

Body Divison

Arthropoda	Mollusca	Hemichordata
3 Parts	3 Parts	3 Parts.
Head	Head	Proboscis
Thorax	Muscular Foot	Collar
Abdomen	Visceral Hump	Trunk.

External Fertilisation

1. Algae (Among Plant).
2. Ctenophora
3. Echinodermata
4. Hemichordata
5. Bony Fishes (Osteicht-)
6. Amphibians (Frog-)

Eg:- Marina - Exocoetus (Flying fish), Hippocam- (Sea Horse). Fresh Water - Labe- (Ro-u), Cat- Clarias (Magur).
Aquarium:- Betta (Fighting Fi-), -terophyl- -ngel Fi-

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Placental Mammals

- Non-Primates (Cows, Sheep, Rats, Deer, Dogs, Tiger) → Oestrus Cycle
- Primates (Man, Ape, Monkey, Lemur) → Menstrual Cycle

Albuminous / Endospermic Seed

- Monocot → Wheat, Rice, Maize, Barley, Coconut — Liliaceae
- Dicot → Castor, Sun Flower — Solanaceae

Non-Albuminous / Non-Endospermic Seed

- Dicot → Peas, Beans, Groundnut, Gram
- Monocot → Orchid

Oldest Seed Dormancy

- 10,000 Yrs → Lupinus Arcticus (Lupine) → Arctic Tundra
- 2000 Yrs → Phoenix Dactylifera (Date Palm) → King Herod's Palace near Dead Sea

Stalk

- Stalk of Flower :- Pedicel
- Stalk of Leaf :- Petiole
- Stalk of Stamen :- Filament
- Stalk of Ovule :- Funicle

Single Cell Protein (SCP)

- Spirulina
- Methylophilus methylotrophus
- Mushrooms

Type of RNA Polymerase

- RNA polym^R I → rRNA (5.8S, 18S, 28S)
- RNA polym^R II → hnRNA
- RNA polym^R III → snRNAs, 5sRNA, tRNA

Reproductive System

	Male	Female
1° Sex Organ	Testes	Ovary
Accessory Duct	Rete Testis, Vasa Efferentia, Epididymis, Vas Deferens	Oviduct, Uterus, Vagina
External Genitalia	Penis	Mons Pubis, Labia Majora, Labia Minora, Hymen, Clitoris
Accessory Glands	Seminal Vesicles, Prostate, Bulbourethral Gland	

Contraceptive Methods

- Natural or Traditional
  - Periodic Abstinence
  - Coitus Interruptus / Withdrawal
  - Lactational Amenorrhea
- Barrier
  - Condoms
  - Cervical Caps
  - Diaphragms
  - Vaults
- IUDs
  - Non-Medicated — Lippes Loop
  - Cu-Releasing
    - Cu T
    - Cu 7
    - Multiload 375
  - Hormone-Releasing IUDs → LNG-20 (Progestasert)
- OCP → Progestogen → Estrogen
- Injectable or Implants
- Sterilisation or Surgical Method
  - Vasectomy (Male)
  - Tubectomy (Female)

Spermatogonia (2n / 46)

Mitosis ↓ Differentiation

1° Spermatocytes (2n / 46) → Meiosis – I

2° Spermatocytes (n / 23) → Meiosis – II

Spermatids (n / 23) → Differentiation → Spermiogenesis

Spermatozoa → Spermiation

Release from Seminiferous Tubule

Sex Determination

1. XO Type — Grasshopper
2. XY Type — Drosophila, Mammals, Man
3. ZW Type — Birds

Haplo-Diploid — Honey Bee Type

Symbols of Human Pedigree Analysis

- □ → Male
- ○ → Female
- ◇ → Sex Unspecified
- ■ ● ◆ → Affected Individuals
- □–○ → Mating
- □=○ → Mating b/w Relatives (Consanguineous Mating)
- Parent above Children below (In order of birth Lt → Rt)
- Parents with male child affected with disease
- (5) → Five Unaffected Offspring

Allele Parent I	Allele Parent 2	Genotype of Offspring	Blood Types Offspring
I^A	I^A	$I^A I^A$	A
I^A	I^B	$I^A I^B$	A
I^A	i	$I^A i$	A
I^B	I^A	$I^A I^B$	A
I^B	I^B	$I^B I^B$	A
I^B	i	$I^B i$	A
i	i	i i	A

Population Attributes

- Birth Rate
- Death Rate
- Sex Ratio
- Age Distribution

Type of RNA

- mRNA → Provide Template
- tRNA → Bring A. Acid; Read Genetic Code
- rRNA → Structural Role; Catalytic Role

Photosynthesis

Light Reaxn (In Grana)	Dark Reaxn (In Stroma)
Light Absorption	Calvin Cycle
Water Spilting	Carboxylation
Oxygen Release	Reduction
Synthesis of ATP & NADPH	Regenration

Basic Need of All Living

- Macromolecules
  - Carbohydrates
  - Protein
  - Fat
- Water & Mineral

Chacterstics	RuBP	PEP
1° CO_2 Acceptor	5	3
No. of C in 1° CO_2 Acceptor	PGA	OAA
1° CO_2 Fixation Product	3	4
No. of C in 1° CO_2 Fixation Pro	Mesophyll	Bundle Sheath
Calvin Cycle Takes Place In	Mesophyll	Mesophyll
Initial Carboxyl^n Reaxn Occ.	One (Mesophyll)	Two (Meso & B.S)
No. of Cell Type That Fix CO_2	Absent	Present
PEP Case Is	Present	Present
RuBis Co is	Mesophyll	Bundle Sheath
RuBis Co in (+) In	Absent	Present
Kranz Anatomy		

Biological N_2-Fixation

- Free-Living N_2-Fixation
  - Aerobic Bac. Eg:- Azotobacter, Beijerinkia
  - Cyano Bact. Eg:- Nostoc, Anabaena
  - Anaerobic Bacteria → Rhodospirillum
- Symbiotic N_2-Fixation
  - With Non-Leguminous Plant Eg:- Frankia
  - With Leguminous Plants Eg:- Rhizobium

Essential Elements

Macronutrients (9)	Micronutrients (8)
C, H, O	B, Cl, Mo
P, K, N	Mn, Fe, Ni
S, Ca, Mg	Cu, Zn

Role of Essential Elements

- Component of Biomolecules :- C, H, O, N
- Components of Energy Related Compounds
  - Mg in Chlorophyll
  - P in ATP
- Alter the Somatic Potetial of a Cell :- K plays an Imp. Role in Opening & Closing of Stomata
- Enzyme Activators
  - Mg < RuBisCo, PEPCase
  - Zn → Alchohal Dehydrogenase, Carboxy peptidase, Carbon Antydrase
  - Mo < Nitrogenase, Nitrate Reductase
  - Fe – Catalase

Glycolysis

Glucose (6C)

ATP → ADP

G-6-P (6C) — Isomerisation

ATP → ADP

F-6-P (6C)

F-1,6-BP (6C)

(3C) PGAL ⇌ DHAP (3C)

$NAD^+ + H^+ \rightarrow NADH^+$

1,3-BPGA (3C)

ADP → ATP

3-PGA (3C)

2-PGA (3C)

H_2O

PEP (3C)

ADP → ATP

PA (3C)

4 ATP

Nitrogen Cycle

N_2 — Nitrogen-Fixation → NH_3 — Ammonification → Organic N_2 of Dead Plant and Animals

NH_3 — Nitrification → NO_3 (Nitrate)

Denitrification

Deficiency Symptoms

- Chlorosis → N, K, S, Fe, Zn, Mg, Mn, Mo
- Necrosis → Ca, Cu, Mg, K, Mo, S, N
- Delay Flowering → Mo, S, N
- Inhibition of Cell Division → Mo, S, N, K

Glucose

Glucose → Pyruvic Acid

- Lactic Acid Fermentation
- Alchohalic Fermentation
- Aerobic Respiration

→ Partial Oxidation → Complete Oxidation

Lactic Acid

Lactate ← Dehydrogenase

$C_6H_{12}O_6$ → PA — P.A.L. Decarboxylase / Alc. Dehydrogenase → Ethanol + CO_2

Dioecious

Plants

Animals

Cockroach

Human

Female

Geological Time Period

1. → 20 BYA → Origin of Universe
2. → 4·5 BYA → Origin of Earth
3. → 4·0 BYA → Origin of Life On Earth
4. → 3·0 BYA → First Cellular Form of Life Originated On Earth
5. → 2·0 BYA → 1st Cellu. Form of Life
6. → 500 MYA → Invertebrate Originated
7. → 350 MYA → Jawless Fish Evolved, Fish Jawed, Sharks And Lobe-Finned Fish Lived, Insects Evolved
8. → 320 MYA → Sea Weeds And Few Plant Existed
9. → 200 MYA → Fish Like Rept. (Ichthyosaurs)
10. → 65 MYA → Dinasaurs Dissapeared
11. → 15 MYA → Primates (Dryopithecous – Ramapithecus Evolved
12. → 3–4 MYA → Man Like Primate Walk In South Africa
13. → 2 MYA → Australopithecous South Africa Grass Land
14. → 1·5 MYA → Java Man (Homo Erectus)
15. → 1,00,000 – 40,000 Yrs Back → Neanderthal Man Lived In Near East & Cen. Asia
16. → 75,000 – 10,000 Yrs Ago (Ice Age) → Modern Homo Sapiens Arose
17. → 18,000 Yrs Ago → Pre-Historic Cave Art Developed
→ 10,000 Yrs Ago → Agriculture Started And Human Settlement Started

Biodiversity Conservation

In-Situ	Ex-Situ
1. Hot Spot (25+3=34)	1. Botanical Garden
2. Biosphere Reserves (14)	2. Zoological Park
3. Wildlife Santuaries (4+8)	3. Wildlife Safari
4. National Parks (90)	4. Cryopreservation
5. Sacred Grooves	5. Tissue Culture
	6. In-Vitro Fertil.
	7. Seed-Bank
	8. Pollen Bank
	9. Gene Bank
	10. Field Gene Bank
	11. Aquaria
	12. Home Gardens

Mutualism

1. Lichen :- Algae BGA + Fungi
2. Mycorrizae :- Fungi + Roots of Higher Plants
3. Plant :- Animal Relationships
   - → Plant – Dispersers Relationship
   - → Plant – Pollinator Relations[hip]

Fig-Wasp	Yucca Moth	Orchid Bees

Immunity (I)

- Innate
  - 4 Types
    - → Physical Barriers → Skin, Mucus Coating of Urg
    - → Physiological Barrier → Acid In Stomach, Saliva In Mouth, Tears From Eyes
    - → Cellular Barrier → WBCs → PMNL, Monocytes, Natural Killer
    - → Cytokine Barrier – Interferons
- Acquired
  - B-Lymphocytes → Antibody Mediated Immunity
  - T-Lymphocytes → Cell Mediat. Immu.

Commonly Abused Drugs

Opioids	Cannabinoids	Coka-Alkaloid
Mor-phine → Poppy Plant Papever Somniferum	Heroin (Smack)	Cannabis Sativa → Marijuana, Hashish, Charash, Ganja	Erythroxylon Coca → Cocaine (Coke or Crack)

Immune System In Body

- Lymphoid (L) Organ
  - 1° Lymphoid Organ Eg:- Bone Marrow, Thymus
  - 2° Lymphoid Organ Eg:- Peyer's Patches, Lymph Node, Appendix, Spleen, Tonsils
- L-Tissue
- L-Cells
- Anti Bodies

Chemical, Enzymes And Bioactive Molecules

- Citric Acid → Aspergillus Niger (Fungus)
- Acetic Acid → Acetobacter Acti (Bacterium)
- Butyric Acid → Clostridium Butylicum (Bacterium)
- Lactic Acid → Lactobacillus (Bacterium)
- Ethanol → S. Cerivisiae (Yeast, Fungus)
- Streptokinase → Streptococcus (Bacterium)
- Cyclosporin A → Trichoderma Polysporum (Fungus)
- Statins → Monascus Pupureus (Yeast)

Cancer Detection & Diagnosis

- → Biopsy & Histopathological Studies
- → Blood & Bone Marrow Test – For Leukemia
- → Radiography → Use of X-Rays
- → CT → Uses X-Rays → Generate 3-D Image
- → MRI → Use Strong Magn. Field, Uses Non-Ionising Radiat[ion], Most Accurate Technique

To Increase Food Production

- Major Role
  - → Animal Husbandry → Dairy Farm Management, Poultary Farm, Bee Keeping, Fisheries
  - → Plant Breeding
- Pivotal Role
  - → Embryo Transfer
  - → Tissue Culture

Animal – Breeding

- In-Breeding
  - Out Crossing
  - Cross Breeding → Eg:- Hisardale (Punjab)
- Out-Breeding
  - Inter Specific Hybridisation → Eg:- Mule

Unusual Flowering Phenomenon

1. → Bamboo → Flower Once In Life → After 50–100 Years → Produce Fruit & Die
2. → Neelakuranji (Strobilanthus Kunthiana) → Flower Once In 12 Years → During Sep–Oct 2006 (Last In 2018) → Found In Kerala, Karnatka, Tamil → Blue Coloured

Pollination

- → Autogamy :- Transfer Of Pollen Grains From Anther To Stigma Of Same Flower
- → Geitonogamy :- Transfer of Pollen Grains From Anther To Stigma Of Another Flower of Same Plant
- → Xenogamy :- Transfer of Pollen Grains From Anther To Stigma of Different Plant

Edible Fishes (E.F)

Fresh Water	Marine
Eg:- Rohu, Catta, Common-Carp	Eg:- Sardine, Hilsa, Mackerel, Pomfrets

Cultured Myeloma Cells + Antibody Producing Cell → Fusion → Hybrid Cells → Cloning → Hybridoma Cells → Producing → Monoclonal Antibodies

Tissue Culture

- → Micropropogation Eg:- Banana, Apple, Tomato
- → Meristem Culture Eg:- Banana, Sugarcane, Potato
- → Somatic Hybridisation Eg:- Pomato

Monoecious

Plants	Animals
Eg:- Maize, Castor, Coconut, Cucurbits, Chara, Pinus	Eg:- Earthworm, Leech, Tape Worm, Sponge

Agents of Pollination

- Abiotic
  - Wind → Eg:- Maize, Grasses
  - Water → Eg:- Hydrilla, Zostera, Vallisenaria
- Biotic
  - Animals
    - Insect (Bee) Eg:- Amorphophallus, Yucca, Fig
    - Bat
    - Bird

Mass Emission Standard In India

Cities of Implementation	Type of Vechicle	Norms
Throughout the Country Since October 2010	2, 3, & 4 Wheelers	Bharat Stage III
13 Mega Cities (Delhi and NCR) Mumbai, Kolkata, Chennai, Banglore, Surat, Kanpur, Agra, Luckn. and Sholapur Since Apr. 2010).	4 Wheelers	Bharat Stage IV

Component of Biodiversity

- Genetic Eg:- Rice (50,000 Strain), Mango, Rauwolfia Vomitaria (1000 Variety)
- Species Diversity Eg:- Western Ghats Have A Greater Amphibian Species Diversity Than Eastern Ghat
- Ecological Diversity Eg:- India Have Greater Diversity Than Norway

Examples

4° Consumer	T_4	4rth Trophic Lev. (Top Carnivore)	Man, Lion
3° Consumer	T_3	3rd Trophic Lev. (Carnivore)	Birds, Fishes, Wolf
2° Consumer	T_2	2° Trophic Lev (Herbivore)	Zooplankton, Grasshopper And Cow, Deer, Bee
1° Producer	T_1	1° Trophic Lev (Plants)	Phyto Plankton, Grass, Trees, Sea Weeds

Nutrient Cycle (N.C)

- Gaseous N.C → C-cycle, N-cycle, P-cycle
- Sedimentary N.C → S-cycle

Axial Skelton (80 Bones)

Skull	29 (8, 14, 1, 6)
Vertebral Column	26 (7, 12, 5, 1, 1)
Sternum	1
Ribs	24 (7, 3, 2) x2
Total	80

Skull Consist 29 Bones

Cranial Bone	8
Facial Bone	14
Hyoid Bone	1
Ear Ossicles	6
Total	29

Recent Extinctions

Dodo	Animal →	From Mauritius
Quagga	→	Africa
Thylacive	→	Australia
Stellar's Sea Cow	→	Russia

Sub-Sps of Tiger (Bali, Javan, Caspian)

Hybrid Varieties

- → Wheat → Sonalika, Kalyan Sona, Atlas – 66
- → Rice → Jaya, Ratna, IR-8, Taichung Native-1
- → Bhindi → Abelmoschus Eseulentus (Prabhani Kranti)

Parthenogensis :- Female Gamete → (Without Fertilisation) → New Organism

Parthenocarpy :- Ovary → (Without Fertilisation) → Fruit

Apomixis :- Ovule → (Without Fertilisation) → Seed

Artificial Hybridisation

- Bisexual Flow.
  - → Emasculation
  - → Bagging
- Unisexual Female Flower
  - → Ba[gging]

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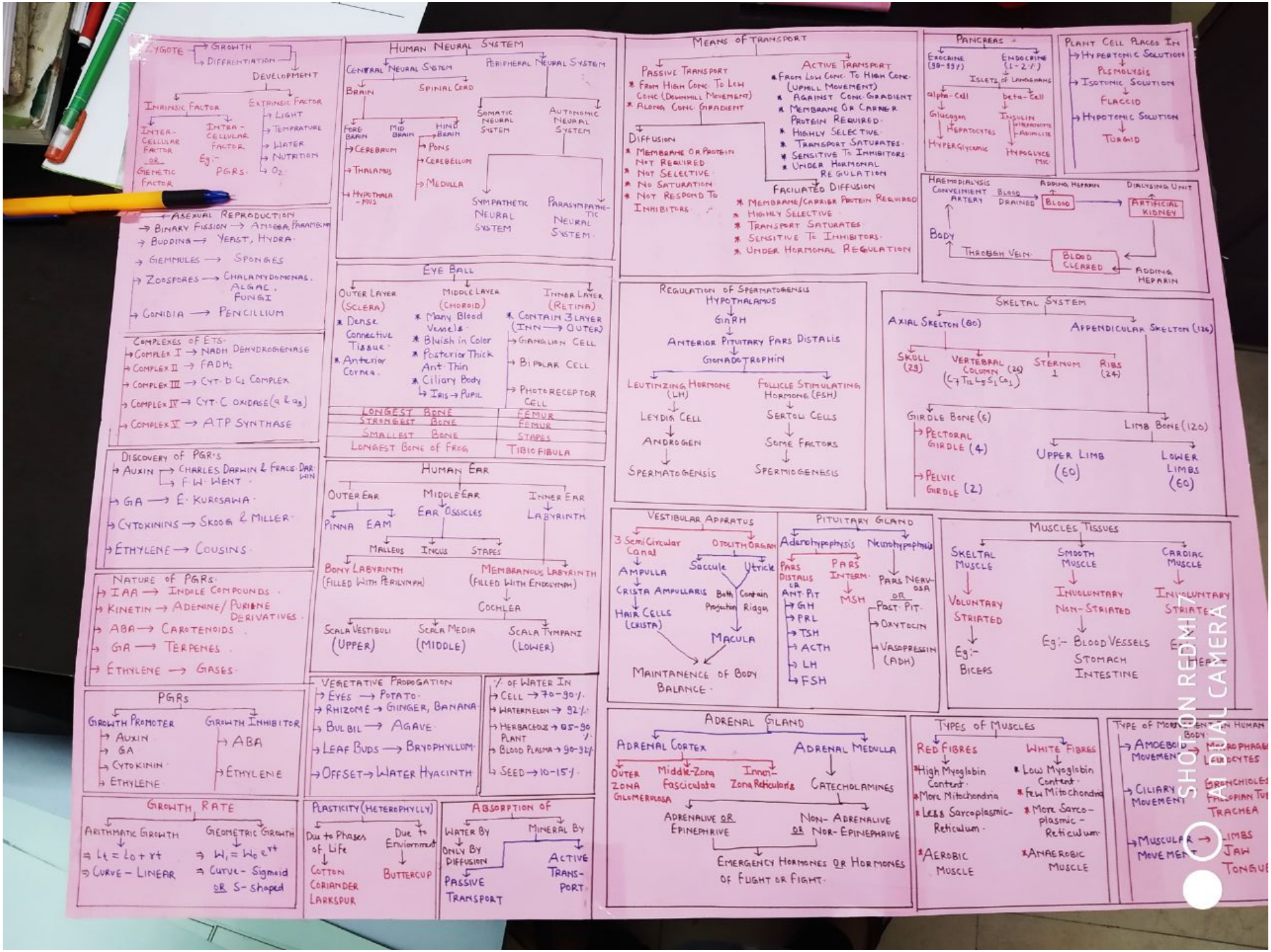
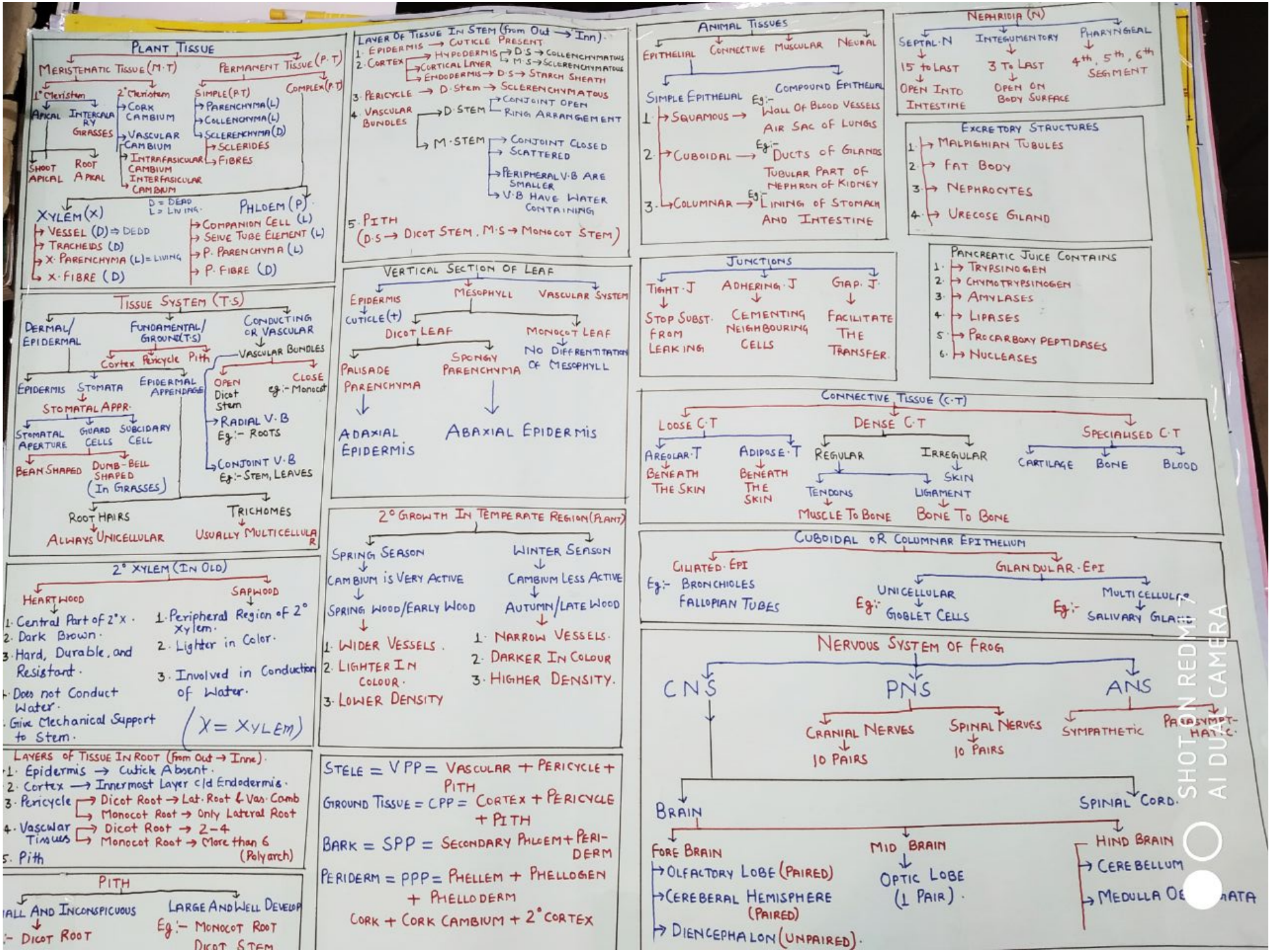

Zygote
Growth
Differentiation
Development
Inrinsic Factor
Extrinsic Factor
Inter-Cellular Factor
Intra-Cellular Factor
Genetic Factor
Eg:- PGRs
Light
Temprature
Water
Nutrition
O2
Asexual Reproduction
Binary Fission → Amoeba, Paramecium
Budding → Yeast, Hydra
Gemmules → Sponges
Zoospores → Chalamydomonas, Algae, Fungi
Conidia → Pencillium
Complexes of ETS
Complex I → NADH Dehydrogenase
Complex II → FADH2
Complex III → Cyt. b C1 Complex
Complex IV → Cyt. C Oxidase (a & a3)
Complex V → ATP Synthase
Discovery of PGR's
Auxin → Charles Darwin & Frais Darwin, F.W. Went
GA → E. Kurosawa
Cytokinins → Skoog & Miller
Ethylene → Cousins
Nature of PGRs
IAA → Indole Compounds
Kinetin → Adenine/Purine Derivatives
ABA → Carotenoids
GA → Terpenes
Ethylene → Gases
PGRs
Growth Promoter
Auxin
GA
Cytokinin
Ethylene
Growth Inhibitor
ABA
Ethylene
Growth Rate
Arithmatic Growth
⇒ Lt = L0 + rt
⇒ Curve - Linear
Geometric Growth
⇒ W1 = W0 e^rt
⇒ Curve - Sigmoid OR S-Shaped
Plasticity (Heterophylly)
Due to Phases of Life
Cotton
Coriander
Larkspur
Due to Environment
Buttercup
Absorption of
Water By
Only By Diffusion
Passive Transport
Mineral By
Active Transport
Vegetative Propogation
Eyes → Potato
Rhizome → Ginger, Banana
Bulbil → Agave
Leaf Buds → Bryophyllum
Offset → Water Hyacinth
% of Water In
Cell → 70-90%
Watermelon → 92%
Herbaceous Plant → 85-90%
Blood Plasma → 90-92%
Seed → 10-15%
Human Neural System
Central Neural System
Brain
Fore Brain
Cerebrum
Thalamus
Hypothala-mus
Mid Brain
Hind Brain
Pons
Cerebellum
Medulla
Spinal Cord
Peripheral Neural System
Somatic Neural System
Autonomic Neural System
Sympathetic Neural System
Parasympathe-tic Neural System
Eye Ball
Outer Layer (Sclera)
Dense Connective Tissue
Anterior Cornea
Middle Layer (Choroid)
Many Blood Vessels
Bluish in Color
Posterior Thick Ant. Thin
Ciliary Body
Iris → Pupil
Inner Layer (Retina)
Contain 3 Layer (Inn → Outer)
Ganglion Cell
Bipolar Cell
Photoreceptor Cell
Longest Bone — Femur
Strongest Bone — Femur
Smallest Bone — Stapes
Longest Bone of Frog — Tibio Fibula
Human Ear
Outer Ear
Pinna
EAM
Middle Ear
Ear Ossicles
Malleus
Incus
Stapes
Inner Ear
Labyrinth
Bony Labyrinth (Filled With Perilymph)
Membranous Labyrinth (Filled With Endolymph)
Cochlea
Scala Vestibuli (Upper)
Scala Media (Middle)
Scala Tympani (Lower)
Means of Transport
Passive Transport
From High Conc To Low Conc (Downhill Movement)
Along Conc. Gradient
Diffusion
Membrane or Protein Not Required
Not Selective
No Saturation
Not Respond To Inhibitors
Active Transport
From Low Conc. To High Conc. (Uphill Movement)
Against Conc. Gradient
Membrane or Carrier Protein Required
Highly Selective
Transport Saturates
Sensitive To Inhibitors
Under Hormonal Regulation
Faciliated Diffusion
Membrane/Carrier Protein Required
Highly Selective
Transport Saturates
Sensitive To Inhibitors
Under Hormonal Regulation
Regulation of Spermatogensis
Hypothalamus
GnRH
Anterior Pituitary Pars Distalis
Gonadotrophin
Leutinzing Hormone (LH)
Leydig Cell
Androgen
Spermatogensis
Follicle Stimulating Hormone (FSH)
Sertoli Cells
Some Factors
Spermiogenesis
Vestibular Apparatus
3 Semi Circular Canal
Ampulla
Crista Ampullaris
Hair Cells (Crista)
Otolith Organ
Saccule
Utricle
Both Contain Projection Ridges
Macula
Maintanence of Body Balance
Pituitary Gland
Adenohypophysis
Pars Distalis or Ant. Pit
GH
PRL
TSH
ACTH
LH
FSH
Pars Interm.
MSH
Neurohypophysis
Pars Nervosa or Post. Pit.
Oxytocin
Vasopressin (ADH)
Adrenal Gland
Adrenal Cortex
Outer Zona Glomerulosa
Middle Zona Fasciculata
Inner Zona Reticularis
Adrenal Medulla
Catecholamines
Adrenaline or Epinephrine
Non-Adrenaline or Nor-Epinephrine
Emergency Hormones or Hormones of Flight or Fight
Pancreas
Exocrine (99-99%)
Endocrine (1-2%)
Islets of Langerhans
alpha-Cell
Glucagon
Hepatocytes
Hyperglycemic
beta-Cell
Insulin
Hypoglycemic
Plant Cell Places In
Hypertonic Solution
Plasmolysis
Isotonic Solution
Flaccid
Hypotonic Solution
Turgid
Haemodialysis
Convenient Artery
Blood Drained
Adding Heparin
Blood
Dialysing Unit
Artificial Kidney
Body
Through Vein
Blood Cleared
Adding Heparin
Skeltal System
Axial Skelton (80)
Skull (29)
Vertebral Column (26) (C7 T12 L5 S1 Co1)
Sternum (1)
Ribs (24)
Appendicular Skelton (126)
Girdle Bone (6)
Pectoral Girdle (4)
Pelvic Girdle (2)
Limb Bone (120)
Upper Limb (60)
Lower Limbs (60)
Muscles Tissues
Skeltal Muscle
Voluntary Striated
Eg:- Biceps
Smooth Muscle
Involuntary Non-Striated
Eg:- Blood Vessels Stomach Intestine
Cardiac Muscle
Involuntary Striated
Types of Muscles
Red Fibres
High Myoglobin Content
More Mitochondria
Less Sarcoplasmic Reticulum
Aerobic Muscle
White Fibres
Low Myoglobin Content
Few Mitochondria
More Sarcoplasmic Reticulum
Anaerobic Muscle
Type of Movement in Human Body
Amoeboid Movement
Macrophages Leucocytes
Ciliary Movement
Bronchioles Fallopian Tube Trachea
Muscular Movement
Limbs Jaw Tongue
SHOT ON REDMI DUAL CAMERA


PLANT TISSUE
MERISTEMATIC TISSUE (M·T)
PERMANENT TISSUE (P·T)
1° Meristem
2° Meristem
Simple (P·T)
Complex (P·T)
Apical
Intercalary
Cork Cambium
Vascular Cambium
Parenchyma (L)
Collenchyma (L)
Sclerenchyma (D)
Sclerides
Fibres
Shoot Apical
Root Apical
Intrafasicular Cambium
Interfasicular Cambium
Grasses
D = Dead
L = Living
Xylem (X)
Phloem (P)
Vessel (D) ⇒ DEDD
Tracheids (D)
X. Parenchyma (L) = Living
X. Fibre (D)
Companion Cell (L)
Seive Tube Element (L)
P. Parenchyma (L)
P. Fibre (D)
LAYER OF TISSUE IN STEM (from Out → Inn)
1. Epidermis → Cuticle Present
2. Cortex
Hypodermis
Cortical Layer
Endodermis
D·S → Collenchymatous
M·S → Sclerenchymatous
D·S → Starch Sheath
3. Pericycle → D. Stem → Sclerenchymatous
4. Vascular Bundles
D. Stem
Conjoint Open Ring Arrangement
M. Stem
Conjoint Closed Scattered
Peripheral V·B are Smaller
V·B have Water Containing
5. Pith
(D·S → Dicot Stem, M·S → Monocot Stem)
ANIMAL TISSUES
Epithelial
Connective
Muscular
Neural
Simple Epithelial
Compound Epithelial
1. Squamous → Eg:- Wall of Blood Vessels, Air Sac of Lungs
2. Cuboidal → Eg:- Ducts of Glands, Tubular Part of Nephron of Kidney
3. Columnar → Eg:- Lining of Stomach and Intestine
NEPHRIDIA (N)
Septal·N
Integumentory
Pharyngeal
15 to Last
3 To Last
4th, 5th, 6th Segment
Open Into Intestine
Open On Body Surface
EXCRETORY STRUCTURES
1. Malpighian Tubules
2. Fat Body
3. Nephrocytes
4. Urecose Gland
TISSUE SYSTEM (T·S)
Dermal/Epidermal
Fundamental/Ground (T·S)
Conducting or Vascular
Cortex Pericycle Pith
Vascular Bundles
Epidermis
Stomata
Epidermal Appendage
Open Dicot Stem
Close eg:- Monocot
Stomatal Appr·
Stomatal Aperture
Guard Cells
Subsidiary Cell
Bean Shaped
Dumb-Bell Shaped (In Grasses)
Radial V·B Eg:- Roots
Conjoint V·B Eg:- Stem, Leaves
Root Hairs
Always Unicellular
Trichomes
Usually Multicellular
VERTICAL SECTION OF LEAF
Epidermis
Mesophyll
Vascular System
Cuticle (+)
Dicot Leaf
Monocot Leaf
No Differentiation of Mesophyll
Palisade Parenchyma
Spongy Parenchyma
Adaxial Epidermis
Abaxial Epidermis
JUNCTIONS
Tight·J
Adhering·J
Gap·J
Stop Subst. from Leaking
Cementing Neighbouring Cells
Facilitate the Transfer
PANCREATIC JUICE CONTAINS
1. Trypsinogen
2. Chymotrypsinogen
3. Amylases
4. Lipases
5. Procarboxy Peptidases
6. Nucleases
CONNECTIVE TISSUE (C·T)
Loose C·T
Dense C·T
Specialised C·T
Areolar·T
Adipose·T
Regular
Irregular
Cartilage
Bone
Blood
Beneath the Skin
Beneath the Skin
Tendons
Skin
Ligament
Muscle To Bone
Bone To Bone
2° XYLEM (IN OLD)
Heartwood
Sapwood
1. Central Part of 2°X.
2. Dark Brown.
3. Hard, Durable, and Resistant.
4. Does not Conduct Water.
5. Give Mechanical Support to Stem.
1. Peripheral Region of 2° Xylem.
2. Lighter in Color.
3. Involved in Conduction of Water.
(X = Xylem)
2° GROWTH IN TEMPERATE REGION (PLANT)
Spring Season
Winter Season
Cambium is Very Active
Cambium Less Active
Spring Wood/Early Wood
Autumn/Late Wood
1. Wider Vessels.
2. Lighter in Colour.
3. Lower Density
1. Narrow Vessels.
2. Darker in Colour
3. Higher Density.
CUBOIDAL OR COLUMNAR EPITHELIUM
Ciliated·Epi
Eg:- Bronchioles, Fallopian Tubes
Glandular·Epi
Unicellular
Eg:- Goblet Cells
Multicellular
Eg:- Salivary Glands
LAYERS OF TISSUE IN ROOT (from Out → Inner)
1. Epidermis → Cutick Absent.
2. Cortex → Innermost Layer c/d Endodermis.
3. Pericycle
Dicot Root → Lat. Root & Vas. Comb
Monocot Root → Only Lateral Root
4. Vascular Tissues
Dicot Root → 2–4
Monocot Root → More than 6 (Polyarch)
5. Pith
STELE = VPP = Vascular + Pericycle + Pith
Ground Tissue = CPP = Cortex + Pericycle + Pith
Bark = SPP = Secondary Phloem + Periderm
Periderm = PPP = Phellem + Phellogen + Phelloderm
Cork + Cork Cambium + 2° Cortex
NERVOUS SYSTEM OF FROG
CNS
PNS
ANS
Cranial Nerves
10 Pairs
Spinal Nerves
10 Pairs
Sympathetic
Parasympathetic
Brain
Spinal Cord.
Fore Brain
Olfactory Lobe (Paired)
Cereberal Hemisphere (Paired)
Diencephalon (Unpaired).
Mid Brain
Optic Lobe (1 Pair).
Hind Brain
Cerebellum
Medulla Oblongata
PITH
Small And Inconspicuous
Large And Well Develop
Eg:- Dicot Root
Monocot Root
Dicot Stem

Roots

- Tap Root → Dicots (Mustard)
- Fibrous Root → Monocots (Wheats)
- Adventitious → Eg:- Grass, Monstera, Banyan

Modification of Roots

- Storage
  - Tap → Carrot, Turnip
  - Adv. → Sweet Potato, Asparagus
- Support
  - Prop → Banyan
  - Stilt → Maize, Sugarcane
- Respiration → Pneumatophores → Eg:- Rhizophora

Regions of Roots

- Meristematic → Thin Walled Dividing Cells
- Elongation → Responsible for Growth of Root in Length
- Maturation → Root Hairs Arises from this Zone

Modification of Stem

- Storage → Zamikand, Ginger, Turmeric (Underground) Potato, Colocasia
- Support (Climbing) → Stem Tendrils Eg:- Gourds, Cucumber, Pumpkin, Grapevines
- Protection → Thorns Eg:- Citrus, Bougainvillea
- Photosynthesis → Opuntia (Flattened), Euphorbia (Cylindrical)
- Vegetative Propogation → Grass & Strawberry, Mint & Jasmine, Pistia & Eichhornia, Banana, Pineapple, Chryxathmum

Parts of Leaf

- Leaf Base
  - Sheathing → Monocots
  - Pulvinus → Leguminous Plant
- Petiole → Hold Blade
- Lamina/Blade → Green Expanded Part → Have Midrib (Middle Prominent Vein)

Types of Leaves

- Simple Leaf → Pinnately Comp. → Eg:- Neem
- Compound Leaf → Palmately Comp. → Eg:- Silk Cotton

Modification of Leaves

- Climbing → Tendrils → Pea (Eg:-)
- Defence/Protection → Spines → Cacti (Eg:-)
- Storage → Fleshy → Garlic, Onion
- Photosynthesis → Expanded Petiole → Eg:- Australian Acacia
- Pitcher → Insectivorous Plant
  - Eg:- Pitcher Plant, Venus Fly Trap

Flower

- Accessory Organ
  - Calyx → Sepals
  - Corolla → Petals
- Reproductive Organ
  - Androecium → Stamens
  - Gynoecium → Carpels/Pistils

Flower

- Hypogynous → Ovary Superior → Mustard, China-Rose, Brinjal
- Perigynous → Ovary Half-Inferior → Plum, Rose, Peach
- Epigynous → Ovary Inferior → Guava, Cucumber, Ray Florets of Sunflower

Symmetry In Flower

- Actinomorphic (Radial) → Eg:- Datura, Chilli, Mustard
- Zygomorphic (Bilateral) → Eg:- Pea, Bean, Cassia, Gulmohar
- Asymmetric (Irregular) → Eg:- Canna

Phyllotaxy

- Alternate → China Rose, Mustard, Sun Flower
- Opposite → Guava, Calotropis
- Whorled → Alstonia

Aestivation

- Valvate → Eg:- Calotropis
- Twisted → Eg:- China Rose, Lady's Finger, Cotton
- Imbricate → Eg:- Cassia, Gulmohar
- Vexillary or Papilionaceous → Eg:- Pea, Bean

Functional Component of Ecosystem

1. Productivity
2. Decomposition
3. Energy Flow
4. Nutrient Cycling

Example of Competition

1. Flamingoes → Fishes
2. ~~Eg~~ Abingdon Tortoise → Goats
3. Barnacle Balancus → Barnacle Chathamalus

Steps of Decomposition

1. Fragmentation
2. Leaching
3. Catabolism
4. Humification
5. Mineralisation

Threat Of Extinction Organism % Species

1. Birds → 12.%
2. Mammals → 23.%
3. Gymnosperm → 31.%
4. Amphibians → 32.%

Alien-Species Invasions

1. Nile Perch (Lake Victoria)
2. Parthenium (Carrot Grass)
3. Latana
4. Eichhornia (Water Hyacinth)
5. Clariasgaripinus (African Catfish)

Placentation

- Marginal → Pea
- Axile → Tomato, Lemon, China Rose
- Parietal → Mustard, Argemone
- Free Central → Dianthus, Primrose
- Basal → Sunflower, Marigold

Stamen

- Remains Free → Polyandrous
- May Be United
  - Monadelphous Eg:- China Rose
  - Diadelphous Eg:- Pea
  - Polyadelphous Eg:- Citrus

Transport Of Molecules

- Passive
  1. Along Con. Gradient
  2. From Higher to Lower Conc.
  3. No Energy Required Eg:- Osmosis
- Active
  1. Against Conc. Grad.
  2. From Lower to Higher
  3. Energy Required Eg:- Na^+/K^+ Pump

Gynoecium

- Single Carpel → Monocarpellary → Eg:- Fabaceae
- More Than One Carp → Multicarpellary
  - Syncarpous (Carpel Fused) → Eg:- Papaver, Mustard, Tomato, Solanaceae, Liliaceae
  - Apocarpous (Carpels Free) → Eg:- Rose, Michelia, Lotus

Types of Chromosomes

- Metacentric → Middle Centromere → Two Equal Arms
- Sub-Metacentric → Centromere Slightly Away from Centre → One Short & One Longer
- Acrocentric → Centromere Situated Close to its end → One Extremely Short One Very Long
- Telocentric → Terminal Centromere

Frut

- Pericarp (Fruit Wall)
  - Dry (Groundnut) → Epicarp, Mesocarp, Endocarp
  - Fleshy (Guava, Mango)
- Seed
  - SeedCoat → Outer Layer → Testa; Inn. Layer → Tegmen
  - Embryo
    - Cotyledons
      - One (Monocot) → Wheat, Maize
      - Two (Dicot) → Gram, Pea
    - Embryonal Axis → Radicle, Plumule

Character	Fabaceae	Solanaceae	Liliaceae
Medicinal Plants	1. Mulaithi	1. Belladona 2. Ashwagandha	1. Aloe
Ornamental Plants	1. Lupin 2. Sweet Pea	1. Petunia	1. Tulip 2. Gloriosa
Gynoecium	1. Monocapellary 2. Monolocular	1. Bicarpellary 2. Bilocular	1. Tricarpellar; 2. Trilocular
Leaves	Alternate	Alternate	Alternate
Fruits	Legume	Berry/Capsule	Capsule, Rarely Berry

Shot on Redmi 7
AI Dual Camera

Characterstics of Living

- Non-Defining Characterstics
  - 1. Growth
  - 2. Reproduction
- Defining Characterstics
  - 1. Metabolism
  - 2. Cellular Organ^{s}
  - 3. Conciousness

Taxonomic Category

Kingdom	Code:- King
Phyllum/Divison	Plays
Class	Chess
Order	On
Family	Fine
Genus	Green
Species	Silk

Common Name	Biological Name	Family	Order	Class	Phyllom/Divison
Man	Homo Sapiens	Hominidae	Primata	Mammalia	Chordata
Housefly	Musca domestica	Muscidae	Diptera	Insecta	Arthropoda
Mango	Mangifera Indica	Anacardia-ceae	Sapindales	Dicotyledo-nae	Angiospermae
Wheat	Triticum aestivum	Poaceae	Poales	Monocoty-ledonae	Angiospermae

Genus	Sps. Epithet	Common Name
Solanum	Tuberosum & Melonena Nigrum	Potato Brinjal (Egg Plant) Makoi
Panthera	Leo Pardus Tigris	Lion Leopard Tiger
Canis	Familaris	Dog
Felis	Domestica	Cat

Taxonomical Aids

- Aids having Specimen
  - 1. Herbarium
  - 2. Botanical Garden
  - 3. Museums
  - 4. Zoological Parks
  - 5. Key
- Aids without Specimen
  - 1. Flora
  - 2. Manuals
  - 3. Monogrphs
  - 4. Catalogues

Characterstics Of Five Kingdom

	Monera	Protista	Fungi	Plantae	Animalae
Cell Type	Prokaryotic	Eukaryotic	Eukaryotic	Eukaryotic	Eukaryotic
Cell Wall	Non-Cellulosic Polysacch + Amino Ac	Present In Some	(+) Without Cellulose	(+) With Cellulose	(−)
Nuclear Membrane	(−)	(+)	(+)	(+)	(+)
Body Organis^{N}	Cellular	Cellular	Multicellular / Loose Tissue	Tissue/Organ	Tissue/Organ / Organ System
Mode of Nutrition	Autotrophic (Chemosyn & Photo) And Heterotrophic Saprophytic/ Parasitic	Autotrophic (Photosynthetic & Heterotrophic	Heterotrophic (Sarrophytic / Parasitic)	Autotrophic (Photo-Synt)	Heterotrophic (Holozoic/ Saprophytic) Etc.

Protozoa

- Amoeboid Protozoan → Pseudopodia → Eg:- Amoeba, Entamoeba
- Flagellated Protozoan → Flagella → Eg:- Trypanosoma
- Ciliated Protozoan → Cilia → Eg:- Paramoecium
- Sporozoan → Spore Like Stage → Eg:- Plasmodium

Nutrition In Bacteria

- Autotrophic
  1. Photo Autotrophic
  2. Chemo Autotrophic
- Heterotrophic
  1. Saprophytic
  2. Parasitic
  3. Symbiotic

Plant Life Cycle & Alternation Of Genr^{N}

- Haplontic → Most of Algae Like Volvox, Spirogyra & Some Species of Chalamydo-monas
- Diplontic → Gymno-sperm, Angio-sperm, Fucus
- Haplo Diplontic → Bryophytes, Pteridophytes, Kelps, Ectocarpus, Polysiphonia

Lichens (SO_2 Pollution Indicator)

- Algae (Phycobiont) → Autotrophic → Prepare Food
- Fungi (Mycobiont) → Heterotrophic → Absorb Mineral, Nutrien^{T} H_2O, & Provide Shelter.

Whittaker Has Used 5 Criteria For 5 Kingdom Classification :

1. Reproduction
2. Cell Structure
3. Phylogenetic Relationships
4. Mode Of Nutrition
5. Thallus Organisation

No. Virus Contains Both RNA & DNA

(i) ssRNA :- TMV, HIV (Retrovirus)
* TMV has a Coiled RNA Strand.

(ii) ssDNA :- ϕX174 Bacteriophage
* Genetic Material Is Infectious

Diseases Caused By Bacteria (Hetero Trophic)

1. Cholera :- Vibrio Cholerae.
2. Typhoid :- Salmonella Thyphi
3. Tetanus :- Clostridum Tetani
4. Citrus Canker :- Xanthomonas Citri

* The Name Virus that Means Venom or Poisnous Fluid Given by Pasteur.
* Ivanowsky discovered Virus ~~by~~ (1892) ~~regr~~ Recognised Certain Microbes as Casual Organism of Mosaic Disease of Tobacco.
* M.W. Beijerinek (1938) Demonstrated that Extract of infected plant of Tobacco Could Cause infection in Healthy Person and c/d the Fluid Contagium Vivum Fluidum.
* W.M. Stanley (1935) Showed that Virus Could be Crystallised & Crystals consist Largely of Proteins.
* They are Inert Outside their Host Ce

Reproduction In Fungi.

- Vegetative Means
  - Fragmen-tation
  - Fission
  - Budding
- Asexual Reproduction
  - Conidia
  - Zoospores → Sporangiospore
  - Oospores
- Sexual Reproduc
  - Ascospore
  - Basidi

Members of Phycomycetes Are Found :-

1. Aquatic Habitat
2. Decaying Wood Moist & ... p Pla
3. An Obligate Parasite On Plants.

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CHORDATA

1. UROCHORDATA
2. CEPHALOCHORDATA
3. VERTEBRATA

DIVISON

AGNATHA (Lacks Jaw)
GNATHOSTOMATA (Bears Jaw)

SUPER CLASS

CLASS
1. CYCLOSTOMATA

PISCES (bear fins)
CLASS
→ CHONDRICHTHYES
→ OSTEICHTHYES

TETRAPODA (LIMBS)
CLASS
→ AMPHIBIA
→ REPTILIA
→ AVES
→ MAMMALIA

(Flying fox), Camelus (Camel), Macaca (Monkey), Rattus (Rat), Canis (Dog), Felis (cat), Elephas (Elephant), Equus (Horse), Delphinus (Dolphin), Balaenoptera (Blue Whale) Ag. Mammals.

NCERT Flying Animals
1. Flying Fish
   Exocoetus :- Bony fish
2. Aves (Bird) :- Mostly
3. Flying fox :- (Pteropus)

Seeliodon (Dog Fish)
Pristis (Saw Fish)
Carcharodon (Great White Shark)
Trygon (Sting Ray)
Torpedo (Electric Ray)

Unicellular Organisms
↓ Capable of
- Independent Existance
- Performing the Essential function of Life.

Component	% of Total Cellu. Mass
WATER	70–90
PROTEINS	10–15
NU. ACIDS	5–7
CARBOHYD.	3
LIPIDS	2
IONS	1

Comparison of Chordates & Non-Chordates

Chordates	Non-Chordates
1. Notochord Present	1. Notochord Absent
2. Central Ner. System is Dorsal, Hollow & Single	2. Central Nervous System Ventral, Double & Solid.
3. Pharynx Perforated By Gill Slits	3. Gill Slits Are Absent
4. Heart Is Ventral	4. Heart Is Dorsal (If Present)
5. A post. Anal Tail Is Present	5. Post Anal Tail Is Absent.

Bacterial Flagella
1. FILAMENT → Longest Portion
2. HOOK
3. BASAL BODY

Inclusion Bodies
1. PHOSPHATE GRANULES
2. CYANOPHYCEAN GRANULES
3. GLYCOGEN GRANULES

False Fishes
1. Jelly Fishes – Aurelia – Coelentrata
2. Cray Fishes – Astacus – Arthropoda
3. Silver Fishes – Lepisma – Arthropoda
4. Cuttle Fishes – Sepia – Mollusca
5. Devil Fish – Octopus – Mollusca
6. Razor Fish – Solen – Mollusca
7. Shell Fish – Mollusca
8. Star Fish – Asterias – Echinodermata
9. Hag Fish – Myxine – Cyclostomata
10. Whale – Balaenoptera – Mammal

Exclusively Marine Grp.
1. Ctenophora (Phylum)
2. Echinodermata (Phylum)
3. Urochordata (Sub-Ph)
4. Cephalochordata (Sub-Phylum)

Endomembrane System
1. E.R → SER / RER
2. G.B
3. LYSOSOME.
4. VACUOLE.

#NEET

Cartilagenous Fish
1. Mostly Marine.
2. Endoskelton is Cartilagenous.
3. Mouth is Ventral.
4. Operculum Absent.
5. Air bladder Absent.
6. Claspers Present.
7. Sexual Dimorphism (+).
8. Gill Slits are 5–7 pairs.
9. Scales are Placoid.
10. Ureotelic.

Bony Fishes
1. Both Marine & Fresh Water.
2. Endoskelton is Bony.
3. Mouth is Terminal.
4. Operculum Present.
5. Air bladder Present.
6. Claspers Absent.
7. Sexual Dimorphism (–).
8. Gill Slits are 4 pairs.
9. Scales are Cycloid, Ctenoid.
10. Ammonetelic

#NEET

2° Metabolites

PIGMENTS	CAROTENOIDS, ANTHOCYANINS.
ALKALOIDS	MORPHINE, CODEINE.
TERPENOIDS	MONOTERPENES, DITERPENES.
ESSEN. OILS	LEMON GRASS OIL.
TOXINS	ABRIN, RICIN
LECTINS	CONCANAVALIN A.
DRUGS	VINBLASTIN, CURCUMIN.
POLYMERIC	RUBBER, GUM, CELLULOSE SUBSTANCES

Double Membrane Bound Organelles
1. CHLOROPLAST/PLASTID
2. MITOCHONDRIA
3. NUCLEUS

Single Membrane Bound Organelles
1. E.R
2. G.B
3. Vacuole
4. Lysosome
5. Microbodies
6. Thylakoids

Non-Mem Bound Organe
1. RIBOSOMES
2. CENTROSOME/CENTRIOLE
3. NUCLEOLUS
4. CYTOKELTAL STRUCTURE

Nucleus
- Chromatin → Nucleo-protein fibre → DNA + Histone Protein + RNA + Non-Histone Protein
- Nucleo-plasm / Nuclear Matrix
- Nucleolus → Non-Membrane Bound Spherical Structure
- Nuclear Membrane

Cilia or Flagella
- Plasma Membrane
- Axoneme (Core) → Microtubules
  - Peripheral Microtubules → 9 Pairs of Doublets.
  - Central Microtubules → 1 Pairs

Plastids
1. CHLOROPLAST → CHLOROPHYLL / CAROTENOIDS PIGMENT
2. CHROMOPLASTS → CAROTENOID PIGMENT → CAROTENE / XANTHOPHYLL
3. LEUCOPLAST → STORAGE
   - Amyloplast → CARBOHYDRATE (STARCH, eg :- Potato)
   - Elaioplast → OILS & FATS
   - Aleuroplasts → PROTEINS

Chemical Analysis
Living tissue (Vege/Liver Piece) Grinding in CCl_3COOH → Thick Slurry → Strain By

- Acid Soluble Pool (Filtrate)
  - Thousand of Org. Compounds.
  - Inorg. Compound (Sulphate, Phosphate)
- Acid Insoluble (Retentate)
  - Only 4 types of Org. Compound Present

Protein | Nucleic Acid | Polysaccharides | Lipids

Biomolecules
- Micromolecules
  - *M. Wt Ranging 18 – 800 Da.
  - *(+) in Acid Soluble Pool.
  - *Many Types.
    - → Glucose
    - → Ribose
    - → Amino Acids
    - → Nitrogen bases
    - → Nucleosides
    - → Nucleotides
- Macromolecules.
  - * M. Wt Range of 10,000 or Above
  - * (+) in Acid Insoluble Pool.
  - * 4 Types.
    - → PROTEINS
    - → NUCLEIC ACID
    - → POLYSACCHARIDES
    - → LIPID (Except M)

Metabolites

1° Metabolites
* Identifiable function
Eg :-
1. Glucose } Sugar
2. Ribose
3. Glycine } Amino Acids
4. Alanine
5. Serine
6. Palmitic Acid (Fatty Acid)
7. Glycerol
8. Triglyceride
9. Lecithin (Phospholipid)
10. Cholestrol
11. Adenine (Purine)
12. Uracil (Pyrimidine)
13. Adenosine } (Nucleosides)
14. Uridine

2° Metabolites
Eg :-
1. RUBBERS
2. DRUGS
3. SPICES
4. SCENTS
5. PIGMENTS
6. ALKALOIDS
7. TOXINS
8. LECTINS
9. TERPENOIDS
10. ESS. OIL
11. CELLOSE
12. GUMS

Element	% Weight Of Earth Crust	% Weight Of Human Body
HYDROGEN H	0.14	10.5
CARBON C	0.03	18.5
OXYGEN O	46.6	65.0
NITROGEN N	Very Little	3.3
SULPHUR S	0.03	0.3
SODIUM Na	2.8	0.2
CALCIUM Ca	3.6	1.5
MAGNESIUM Mg	2.1	0.1
SILICON Si	27.7	NEGLIGIBLE

SHOT ON REDMI 7
AI DUAL CAMERA